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ABSTRACT

These five papers are from a symposium that was facilitated by Michael Leimbach at the 1995 conference of the Academy of Human Resource Development (HRD). "Developing Systems Thinking Ability in Organizations" (Carol Ann Zulauf) reports a study that examined the relationship between cognitive complexity, locus of control, and selected mediating variables. It presents findings that show several predictor variables correlate significantly with systems thinking. "Leveraging Quality Initiatives through Action Technologies" (Thomas J. Shindell, Robert L. Dilworth) outlines the characteristics of action research, action learning, and action science and provides a road map that can contribute to the creation of learning organizations. "Career Development Needs of Safety Professionals" (Joe W. Kotrlik, Cyndi H. Gaudet) reports study results that indicate respondents perceived that their level of expertise in trainer competencies was between basic and intermediate and their level of ethical practice needed little or no change in seven issues and some change in six ethical issues. "Instructional Design in the Context of Situated Learning" (Sean Courtney) reports on an action-research study in which the instructor sought to situate a graduate-level course in instructional design in a real-world context. "A Model for Developing Foreign Language HRD Programs" (Zita Jusinskas Halka, Robert E. Nolan) proposes a model for developing effective foreign language training programs within the business and industrial settings. (YLB)

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[8] CONTEXTUAL LEARNING ISSUES Facilitator: Michael Leimbach, Wilson Learning

Developing Systems Thinking Ability in Organizations
Carol Ann Zulauf, Suffolk University

Leveraging Quality Initiatives Through Action Technologies
Tom J. Shindell, Texas Department of Health
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Career Development Needs of Safety Professionals
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A Model for Developing Foreign Language HRD Programs
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Developing Systems Thinking Ability in Organizations

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With the myriad changes facing businesses today, a key growth factor may be workers' ability to think critically. This study focused on the development of a particular kind of critical thinking ability: "systems thinking." This research examined the relationship between cognitive complexity, locus of control, and selected mediating variables. The results from this research shows that several of the predictor variables correlate significantly with systems thinking. The results have implications for training and development practitioners.

Many organizations today are undergoing tremendous changes in their organizational structures. Going from a hierarchical structure to a more team-based structure signals a shift in decision-making responsibility to those throughout the organization. As Peter Senge (1992) states, "It is simply no longer possible to have 'one great systems thinker' at the top - a single individual who figures things out and then devises the mechanisms and structures to translate his insights into organizational action." Can systems thinking be fostered at different levels of the organization when, in the words of Stata (1992), "there are very few [in] companies that are truly 'systems thinkers'"? This is a question that intrigued me immensely. After observing several trainees give up in frustration diagramming a business problem via causal loops, I began to ask what went into developing this skill. First, however, there will be a definition of what comprises systems thinking.

Systems thinking is the art and science of making reliable inferences about behavior by developing an increasingly deep understanding of underlying structure (Richmond, 1994, p. 139). Systems thinking requires the person to organize and understand how actions reinforce, balance, or counterbalance each other. Understanding feedback is thought to be a building block for learning to recognize and understand consequences of actions. This kind of thinking requires individuals to look at the dynamic feedback within the system itself as being responsible for generating the behavior patterns exhibited by the system, rather than the exogenous factors we often identify as causes (Richmond, 1993). This shift in viewpoint would appear to coincide, at the level of the individual, with adoption of an internal locus of control or responsibility--at least, that was the primary assumption of this study.

The emphasis in this study was on the subject's understanding of feedback and its consequences in performing analytical tasks. More specifically, the focus was on whether individuals are able to make the shift in viewpoint from a belief in external causality to understanding the interrelationships in certain closed-loop dynamic processes. It also explored the role that mindset might play in the development of systems thinking skills. This had been brought to light by Professor Lynn Isabella (1994) at the University of Virginia who found that only ten percent of executives seem to have a mindset that searches for connections between seemingly unconnected variables. The executives with this mindset also received the highest job performance ratings of the entire group (Isabella, 1994, p. 11). Locus of control and the "mindset," operationalized in this study as cognitive complexity, served as the overriding conceptual frameworks for this research.

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Research Questions

This study attempted to answer the following questions: (1) Is there a relationship between stages of cognitive complexity and level of success on systems thinking tasks? (2) What is the relationship between "environmental complexity" and systems thinking? Environmental complexity is being defined as the level of complexity in decision making. (3) What is the relationship between locus of control and systems thinking? (4) What is the relationship between the additional mediating variables identified in this study and systems thinking ability? Those mediating variables are gender, age, occupational level, and educational level.

Methodology

This section describes the research methodology. A discussion of the general approach, subjects, instruments, and assumptions made about the data before analysis will be undertaken.

General Approach. The purpose of this study was to investigate the relationship between the predictor variables and the criterion variable, systems thinking. Since this research is dependent upon the relationship between given attributes of the subjects and the criterion variable, an objective, quantitative methodology that provided descriptive statistics was utilized. Specifically, this study is correlational in nature. By analyzing the relative effects of predictor variables in combination, via multiple regression, a better prediction can be made as to their relationship to the criterion variable (Anderson, 1990).

Subjects. The subjects in this study were selected from intact occupational groups, classified as managerial, professional, technical, and clerical/support staff of a large, US-based corporation. Because this research relied upon given attributes of the subjects, i.e., classified into specific occupational groups, random assignment was not an appropriate selection procedure (Kerlinger, 1986, p. 349). In the case of the managerial and technical populations, an on-going training class was being conducted for those respective audiences and these groups were asked to participate in the study. Summer vacations contributed to a smaller sample size than expected. Nonetheless, the sample size of 77 was large enough for the number of variables in the regression analysis.

Instruments. Five instruments were used in this study. This researcher received permission to use those instruments which were developed by others from the authors themselves. Reference to those instruments involve Tuckman's Interpersonal Topical Inventory and Pettersen's Perception of Internal-External Locus of Control in the Workplace. The Demographic/Environmental Data Survey and the Post-Evaluation Questionnaire were developed by this researcher. The Structural Integration Assessment is a compilation of a concept map, causal map, and systems archetype which are all tools developed by others to measure different thinking processes. These instruments will be discussed in more detail below.

Tuckman's Interpersonal Topical Inventory (1966a). This instrument measures low to high (1-4) stages of cognitive complexity. Tuckman's ITI incorporates all the underlying structural components of cognitive complexity that were proposed by Harvey, Hunt, & Schroder, (1961). Those four stages of cognitive complexity that had been postulated by Harvey, Hunt, & Schroder (1961, pp. 87-90) and which is captured and measured by Tuckman's ITI are:

Stage 1:	Dependence on absolutism, external control
Stage 2:	More differentiated than at Stage 1 - Questioning of absolutistic control yet dependence on external support/help
Stage 3:	Emergence of internal causation in order to experience consequences; mutuality, conditional dependence
Stage 4:	Most abstract stage; development of internal and informationally based concepts that act as a referent for evaluating feedback

The progression to higher, more abstract stages are possible if the conceptual level and developmental (environmental) conditions are favorable to such development. It is assumed that

environmental conditions facilitate openness to the discrepant conceptual differentiations required for progression (Harvey, Hunt, & Schroder, 1961, p. 87). Development of more abstract conceptual structures emerge as a result of the integrations that occur at each level along the concrete-abstract dimensions (Harvey, Hunt, & Schroder, 1961, p. 87).

The progressive development at each level which is facilitated by (favorable) environmental conditions in order to induce openness of the conceptual system of the individual to differentiations and integration at each stage also includes the progression of the self from a dependence on external sources to a reliance on internal causation--the other predictor variable in the study, locus of control.

The ITI incorporates the underlying components of integrative complexity based on the differentiation at each stage and the emergence of internal causation as one progresses to higher stages. All of this is made possible by the environmental influences on the conceptual system.

The ITI measurement represents all combinations of the four conceptual system stages just described. Subjects who take the test are asked to choose one each of a pair of items that best represent how they would respond to an interpersonal topic designed to present uncertainty, discrepancy, or constraint and the need to resolve this interpersonal conflict. As an example, one question stem, "When I am criticized," would be followed by six different pairs of responses. The subject must pick one response from each pair. Each member of a pair represents a typical response for a different system. All possible paired combinations of the four systems go to make up the six pairs (Tuckman, 1966b). The final system score is determined by comparing each of the subject's scores to the appropriate norm-referenced group.

Test-retest reliability coefficients for each system score range from .42 to .54 (Tuckman, 1970). Criterion-related validity reported by Tuckman (cited by O'Neill, 1985, p. 81) indicate a correlation of .54 between the Paragraph Completion Test and the ITI.

Pettersen's (1982) Perception of Internal-External Locus of Control in the Workplace. This questionnaire is composed of two parts. The first aims to measure the perception of the subject regarding his level of control in the work situation. The person has to respond (on a Likert-type, 5-point scale) to 28 questions reflecting different occupational aspects and events which are under his own control. Adding the responses from the scale and dividing that result by 140 (which represents the total for part one) results in the score for part one. The higher one scored on this part (i.e., a 90%), the more internally oriented that respondent is.

The second part of the questionnaire measures the perception of the subject according to the influence which he attributes to the different external causes encountered in his work situation (those causes being: chance, superiors, co-workers, subordinates, organizational politics) (Pettersen, 1985, 1982).

Part two consists of 18 questions, also based on a Likert-type, 5-point scale. The scoring procedure and the interpretation is the same as in part one: Adding the responses from the scale and dividing that result, this time by 450 (18 questions x 25 possible points for each question due to the 5 subscales for each question: chance, superiors, co-workers, subordinates, organizational politics). Higher scores on this part reflects the respondent's feeling that other causes influence aspects and events in his job.

These two parts reflect the two conceptual distinctions of this construct: that of locus of control and causal attribution, respectively. The first part of the questionnaire which measures the subject's perceived influence over several reinforcements contains statements such as, "In my current job, I feel I can influence raises in my salary." The second part, focusing on the perception of control exerted by various causal agents over the same reinforcements, contains statements such as, "In my current job, the degree to which each of the different causes (chance, superiors, co-workers, subordinates, organizational politics) can influence my receiving a raise in salary" (Pettersen, 1982).

Data obtained with this questionnaire show that the reinforcement control scale does not correlate systematically with the causal attribution scale and, therefore, contributes to the conceptual distinction of locus of control and causal attribution (Pettersen, 1987, p. 207).

This questionnaire which was designed specifically for the work context, correlated with the criterion variable, job satisfaction, better than Rotter's I-E scale ($t=2.50$, $p<.01$), suggesting its practical usefulness (Pettersen, 1987, p. 207). Internal validity for this instrument was undertaken by a test-retest procedure and resulted in Alpha coefficients ranging from .90 to .96 (Pettersen, 1982, p. 11).

Where this questionnaire measures both the subject's perception of his own power in the work environment, as well as his perception of power held by other causal agents within the context of the work environment and structural constraints, it contributed to a realistic and holistic look at the respondents.

Demographic/Environmental Data Survey. The additional predictor variables age, gender, occupational and educational levels, and the perception of complexity in decision-making were accounted for in this study via the Demographic/Environmental Data Survey developed by this researcher.

Structural Integration Assessment. This assessment was used to measure the criterion variable, systems thinking. The assessment consisted of three parts:

Part I: Concept Map Development. Construction of a self-generated concept map which visually illustrates the subject's degree of progressive differentiation by the number and kind of valid relationships recognized among concepts in a particular content area was used. This content area was based on a business story illustrating one of the frequent systems archetypes: Limits to Growth (Senge, 1990).

Part II: Causal Map Representation. The construction of a causal map illustrates those key variables which influence each other in a closed-loop causal relationship.

Part III: Systems Archetype, Limits to Growth, Application. The systems archetype represents a generic template which identifies the patterns that control events (Senge, 1990). Construction of a systems archetype provided the opportunity for each subject to demonstrate an application of the dynamic interconnections operating within a department of a corporation.

Interrater reliability was undertaken for all three systems thinking tasks. The reliability procedures were adapted from Eichelberger's (1989, pp. 132-133) methodology for calculating the percentage of agreement between two scorers. There were two scorers for each of the tasks: the principal scorer and the interscorer. The procedures resulted in reliability measures of 88% for the concept maps; 81% for the system archetypes; and 88% for the causal maps.

Post-Evaluation Questionnaire. The Post-Evaluation Questionnaire was developed by this researcher. It was a Likert-type assessment asking the respondents' perception of the complexity of the business story, their interest level, and any additional comments.

Assumptions made about the data. Several decisions needed to be made about the data before analysis:

- The number of subjects from managerial and professional groups were combined due to the fact that there were only three subjects from the professional group.
- The number of subjects from the Post-Graduate category and the subjects from the Masters category were combined into one Graduate category due to the fact that there was only one response in the post-grad category.
- In order to remove the non-essential colinearity involving age, several additional computational notations were included with this variable.
- Occupational level 4 (Support) and Educational level 1 (High School) are used as the reference group. The results generated from the managerial and technical groups will be compared to this support group. For example, those in the managerial group receive 7 points higher on the causal map in relation to the support group. The same interpretation holds true for the educational level.
- Dummy coding was used to check for a nonlinear relation of the cognitive complexity variable.

Results

This section presents the results of the data analysis. A quantitative analysis of the major predictor variables was undertaken. A description of the study population will precede the analysis of results.

The group of 77 subjects (65% response rate) was drawn from intact occupational groups from a large, US-based telecommunications corporation. Those groups being classified as managerial, professional, technical, and clerical/support staff. The actual frequencies associated with each occupational level is presented in Table 1.

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Table 1. Occupational Level Frequencies: Study Population

Occupational Level	Frequency	Percent	Cumulative Frequency*	Cumulative Percent
Managerial	33	43.42	33	43.42
Professional	3	3.95	36	47.37
Technical	21	27.63	57	75.00
Clerical/ Support	19	25.00	76	100.00

*Frequency Missing = 1

The educational levels attained by the study population indicate that almost 69% of the subjects in the study have not pursued formal education past the two-year post-secondary level. A breakdown of those educational levels for the study population is as follows in Table 2.

Table 2. Educational Level Frequencies: Study Population

Educational Level	Frequency	Percent	Cumulative Frequency	Cumulative Percent
High School	34	44.16	34	44.16
Two-Yr. Post-Secondary	19	24.68	53	68.83
Bachelor's	18	23.38	71	92.21
Master's	5	6.49	76	98.70
PostGrad	1	1.30	77	100.00

It was hypothesized that the higher one scored on the measure of cognitive complexity (range being 1-4, with 4 representing the most abstract level of thinking, possessing the ability to deal with ambiguities and be able to see many interconnections) the more that person was able to think systemically. Table 3 illustrates the stages of cognitive complexity of the study population.

Table 3. Stage of Cognitive Complexity: Study Population

Stage of Cognitive Complexity	Frequency	Percent	Cumulative Frequency*	Cumulative Percent
1	23	32.4	23	32.4
2	29	40.8	52	73.2
3	14	19.7	66	93.0
3.5	1	1.4	67	94.4
4	4	5.6	71	100.0

*Frequency Missing = 6

Notice that 73 percent of this study population possess the tendency to think more concretely (as represented by Stages 1 and 2). Environmental complexity, defined as the level of complexity in decision making, is presented next in Table 4. This question was scored on a scale of 1-5, with 5 representing decisions of extreme complexity (i.e., ill-defined, ambiguous situations).

Table 4. Level of Decision Making: Study Population

Level of Decision Making*	Frequency	Percent	Cumulative Frequency	Cumulative Percent
2	11	14.3	11	14.3
2.5	4	5.2	15	19.5
3	24	31.2	39	50.6
3.5	7	9.1	46	59.7
4	19	24.7	65	84.4
4.5	8	10.4	73	94.8
5	4	5.2	77	100.0

*Scale 1-5

The means and standard deviations for the study population are given below for all the variables.

Table 5. Means and Standard Deviations: Study Population

Variable	N	Mean	SD
Stage of Cognitive Complexity	71	2.0	0.9
Locus of Control	77	60.9	13.1
Causal Attribution	76	58.0	11.7
Decision Making	77	3.4	0.9
Educational Level	77	1.9	1.03
Interest	71	3.4	1.1
Complexity	71	2.86	0.9
Age	76	41.9	7.87
Concept Map	61	36.9	17.9
Causal Map	62	46.5	16.5
Systems Archetype	63	57.2	20.7

Differences with N reflect missing data

The next statistical analysis involved examining the degree of relationship between the predictor and criterion variables in the study. The significant findings from the correlations are highlighted:

- Age and gender were found to be nonsignificant.
- Occupational level and educational level were found to be highly significant with completion of the causal maps and systems archetype (r=-0.485, p .00001; r=-0.393, p .001).
- The negative correlation generated for occupational level signifies that those in the lower occupational levels (i.e., 1= managerial; 2=professional) performed higher on that criterion measure.
- Performance on the concept map task for all the variables was rather lackluster.
- Decision-making was found to be nonsignificant.
- Cognitive complexity exhibited a statistically significant correlation with the systems archetype task (p .007).
- Locus of control and causal attribution were highly significant in relation to each other (p .002). Here, the more the subject recognizes the influence of external factors, the more the subject tends to perceive control of these same factors.
- A higher internal locus of control also contributed to a statistically significant finding on the performance of the causal map (p .015).

- The non correlation between cognitive complexity and locus of control supports other research[1] which also failed to find a relationship between locus of control and various measures of differentiation.
- Interest was also statistically significant, especially with the causal maps and systems archetypes (p .025; p .042, respectively).

In this study, three sets of regressions had been undertaken. The three regressions are for the three separate tasks, i.e., concept map, causal map, and systems archetype, which were used to measure the criterion variable. The significant predictors from the multiple regressions are reported in Table 6:

Table 6. Significant Predictors of Systems Thinking Tasks

Systems Thinking Tasks	Percentage of Variance Explained (Adjusted)	Significant Predictors
Causal Map	46%	Occupational Level Educational Level Cognitive Complexity
Systems Archetype	19%	Occupational Level Cognitive Complexity
Concept Map	4%	Perception of Complexity

The above predictors account for 46% (adjusted) of the variance on the performance of causal maps and produced a significant equation (F=7.89, p .00001). For those in managerial positions, the predicted value of the criterion variable will increase by 8.6 points. The predicted value of the criterion variable for those in technical positions would decrease by 11 points. For the educational levels, those possessing a post-secondary education will increase the predicted value of the criterion variable by 5 points; those with a bachelor's degree will increase the predicted value by 14 points. The predicted value of the criterion variable for those possessing experience on the graduate level would decrease by five points relative to the reference group.

Regarding cognitive complexity, there emerged a non-linear relation: With each unit increase up to Stage 2 in cognitive complexity, there is an increase in the causal map score by 9 points (i.e., going from Stage 1 to Stage 2). Progressing from Stage 2 to Level 3 increases the causal map score by 21 points. Going from Stage 3 to 4 produces an increase in score by another 9 points. Therefore, the difference from a Stage 2 to Stage 4 is 30 points.

For the systems archetype, 19% (adjusted) of the variance is accounted for by two predictor variables: Occupational level and cognitive complexity. This regression also produced a significant equation (F=5.48, p .002). For those in managerial positions, the predicted value of the criterion variable will increase by 16 points. For those in technical positions, the predicted value of the criterion variable will also increase by 5 points. Cognitive complexity emerged in linear form in this particular regression: for each unit increase in the predictor variable, for example going from Stage 1 to Stage 2, or Stage 2 to Stage 3, etc., the predicted value of the criterion variable will also increase by 6.7 points.

For the concept map, only one predictor variable, perception of complexity, remained in the analysis to produce an equation approaching significance (F=3.73, p .058). This one predictor variable accounted for only 4 percent of the variance in the criterion variable, concept maps.

[1]Due to the apparent similarities between locus of control and differentiation constructs, other researchers (Rotter, Chance & Goldstein, to mention a few, as reported in Lefcourt, 1982, p. 70) also failed to find a relationship between locus of control and various measures of differentiation.

Discussion

The overall results of these findings indicate that there may be a sequence to learning; i.e., that causal influences are detected with greater understanding than the structural patterns inherent in the systems archetypes and the causal interactions take precedence over the hierarchical structure inherent in the concept maps. Even one subject in the study commented on the Post-Evaluation questionnaire that he found the concept maps difficult to do without using feedback..."I tend to think in terms of causal loop diagrams and not in terms of hierarchies."

Having occupational level emerge as a significant regressor made a lot of sense from both a statistical and a substantive point of view. Even though internal locus of control had a very strong relationship with the criterion measures, causal map and systems archetype, ($r=.30$, p .01; $r=.23$, p .06, respectively) it was not included in the final model due to the fact that whatever relationship it had with these criterion measure was redundant with occupational level, which had a stronger correlation with the criterion variables ($r=-.48$, p .00001; $r=-.39$, p .0016, respectively).

Generally, those in higher educational levels performed better on the criterion measures, especially the causal maps and system archetype. There did emerge a decrease in performance for those with higher levels of education. This may be due to the fact that only 6 subjects were in this category, accounting for approximately seven percent of the total sample.

Having cognitive complexity emerge as a significant regressor in predicting success on the systems thinking tasks, causal maps and systems archetypes, lends support to Richmond's (1994) assertion that "cognitive overload" is a significant reason for individuals giving up when it comes to engaging these particular thinking skills. In this study, it did not appear that the subjects suffered from "cognitive overload." In fact, the more abstract the subjects were in cognitive complexity, the better they performed.

Finally, having the perception of complexity emerge as a regressor in the completion of concept maps can be interpreted in light of research reported by Schroder, Driver, & Streufert (1967) that a moderate amount of complexity is not harmful to complex performance. This research seems to support that finding that an optimum amount of complexity spurred the subjects to successfully complete the concept maps.

Limitations on the generalizability of results from this part of the study is warranted due to the fact that only 4 percent of the variance in the criterion measure, concept map, was accounted for and only 19 percent of the variance in the criterion measure, systems archetype, was accounted for.

Conclusions, Implications, and Recommendations

Given these limitations, the findings of this study are still strong enough to support two conclusions. First, cognitive complexity and occupational level were consistent predictors for the causal maps and systems archetype measures. Second, the relationship between the predictor variables and systems thinking is very involved and complex.

The first major implication is that further research is needed to determine other mediating variables that could contribute to the variance in these criterion measures. The second implication is whether there is a sequence to the various thinking skills as has been proposed by Richmond (1993). The results have some potential implications for business training also. For example, if we expect technical workers to engage in systems thinking, they may have to be exposed to the same experiences and educational opportunities the managers and professional workers receive. In light of all the above considerations, the following recommendations are made:

1. Study the effects of other potential mediating variables.
2. Design an experimental study whereby the subjects are exposed to the tools and techniques of systems thinking/system dynamics; i.e., causal loops, systems archetypes, simulations in different order to determine its effect on learning.
3. Study the effects that the inherent managerial competencies have on technical workers engaged in systemic thinking.

Systems thinking focuses our attention on those dynamic connections and interdependencies in any given business issue. It has the potential to assist all in the organization to embrace a holistic perspective, especially given the proliferation of restructurings in corporations today. Thinking this way allows one to see and understand the whole of a situation. By living this way, one also possesses the freedom and power to design one's own life.

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Leveraging Quality Initiatives Through Action Technologies

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Many organizations are implementing Quality Management or Organizational Learning initiatives. Some are trying to do both. Comparatively few are successful in accomplishing their objectives. In attempting to develop team-based, critically reflective, quality-driven learning, they fail to draw on action technologies or frequently employ the wrong action technology for the wrong reason. Organizations need a "road map" to guide them in the use of action technologies. This paper provides such a road map.

The three action technologies--action research, action learning, and action science--can be critical in leveraging quality initiatives. However, there is often little conscious linkage of action technology to such initiatives. When an action technology is utilized, it is often employed incorrectly. This paper outlines the characteristics of the three technologies and provides a road map that can leverage quality initiatives and contribute to the creation of learning organizations.

Problem Statement

Numerous organizations are implementing Quality Management initiatives at a furious pace. At the same time they are also striving to become learning organizations. As organizations strive to develop team-based, critically reflective, quality-driven learning, they often attempt to implement the wrong action technology for the wrong reason. Organizations, therefore, need a "road map" to guide them in the appropriate choice and use of action technologies.

Theoretical Framework

The three action technologies--action research, action learning, and action science--all have their theoretical roots in proactive, practical theorists. Kurt Lewin (Marrow, 1969) saw action research as a means for involving individuals affected by a problem as participants in the solution of the problem. Reg Revans (Revans, 1980) sees action learning as a way to test the underlying assumptions of problems by having outsiders (who view problems in a new light) ask insiders challenging questions. Chris Argyris (Argyris, Putnam, and Smith, 1985) sees action science as a process for discovering the underlying reasoning that causes individuals and organizations to unknowingly create problems.

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Research Questions

1) How can each action technology uniquely support the implementation of Quality Management initiatives?, 2) How can each action technology uniquely support the development of Learning Organizations?, and 3) When should each action technology be used?

Methodology

Literature review and logical analysis were used to answer the three research questions. Literature review was used to define, identify the characteristics, and specify the uses of each action technology. Logical analysis was used to develop matrices demonstrating the appropriateness and applicability of each action technology in the support of Quality Management initiatives and the development of organizational learning. It is innovative practice to compare action technologies as is done in the matrices. Such juxtaposition allows for direct comparisons of the technologies relative to the types of technology, each other, and a broad area of inquiry (e.g., barriers to Learning Organizations).

Quality Management Context

Recent surveys conducted by Arthur D. Little and others indicate that only 20 to 36 percent of companies with TQM programs achieve tangible improvements in quality, productivity and competitiveness (Training and Development, June 1994). One reason for the low improvement, usually after considerable expenditure of training funds, is failure to change organizational behavior. Employee involvement, which can be considered a main pillar of Quality Management, is often spotty, at best. Top management may, at the same time, provide only limited support, or have limited knowledge of what Quality Management entails if it is to be successful.

Three rather pronounced trends in the evolution of Quality Management add impetus to the use of action technologies. The first is reengineering of the business processes, which can be radical and far-reaching. "People who once did as they were instructed now make choices and decisions on their own instead" (Hammer & Champy, 1993, p. 65). No company better exemplifies the power of linking action technologies to Quality Management than GE. Their strategy centers on use of three "weapons," otherwise known as management techniques: Work-out, Best Practices and Process Mapping. (Fortune, August 12, 1991, p. 41). The centerpiece is the work-out, with over 200,000 GE employees having experienced one by mid-1992, less than four years after they were inaugurated. They are patently an action learning approach, with small groups brought together empowered and allowed to develop their own problem solving agenda. The second related trend is the transformation of organizational culture, recognizing that organizations cannot change processes and create a quality emphasis without concurrently changing what people value and the way they think. The third trend brings the emphasis on using action technologies full cycle by recognizing the interlinkage between the continuous process of improvement (Kaizen) of Quality Management with the need for a continuous process of learning (The Learning Organization). It is this confluence of the two streams--Quality Management and Learning Processes--that produces the opportunity to use action technologies.

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Harnessing the Action Technologies to Leverage Quality

When an organization is implementing Quality Management or striving to be a learning organization, unforeseeable problems, obstacles, and barriers will inevitably occur. While organizations cannot avoid all potential implementation problems, they can judiciously utilize action technologies to help solve problems once they do occur. These action technologies can be powerful in facilitating the authentic progress of Quality Management initiatives which are floundering or experiencing difficulty. Specifically, action technologies can promote active employee participation, increase organizational ownership, encourage new insights, and challenge established perspectives on organizational problems or dilemmas. Thus, action technologies, by engaging employees directly in wrestling with difficult or problematic issues, can help achieve increased organizational congruence.

General Characteristics and Quality Management

The first matrix display (Table 1) on General Characteristics depicts some critical interfaces between various aspects of a technology (e.g., critically reflective) and the three technologies themselves.

The first matrix or road map outlines both similarities and differences between the technologies in these selected areas, providing an index to which technology is best suited to a given area of interest. For example, it shows that the Action Learning Set and Action Science Group represent a more complete fit than action research team if critical reflectivity is an issue. Similarly, systemic perspective is better served by Action Learning Sets and Action Science Groups. If using an iterative process, Action Research and the Action Learning Set are more suitable than Action Science Group. As depicted in the matrix, there can be subtleties in the way questions are framed, depending on which action technology is employed.

The second matrix, labeled Quality Management, serves to answer the first research question relative to how each action technology can support the implementation of Quality Management initiatives. It vividly shows that all three technologies can be used to treat a variety of areas that can facilitate the implementation of Quality Management.

Reviewing the various interfaces between type of technology and the three technologies in Table 2, it becomes evident that there is a very strong match up with the various foci of Quality Management, particularly as concerns the need to transform organizational thinking. As Watkins & Marsick suggest (1993, p. 120):

> All three action technologies are aimed at organizational change. In action research, people use data to inform action. In action reflection learning, people learn how to learn from their experience so that they can act more effectively. And in action service, people examine their experience to see patterns of learning, or meta-learning.

Any of the three technologies can have a favorable effect. It becomes a matter of organizational fit.

General Characteristics of Action Technologies
Matrix

Table 1

	Names of action technology groups?	Focus of the action technology method?	Does the group need a facilitator?	Is an iterative process used?	What types of questions are asked?	Technology frames or re-frames problems?	Technology solves problems?	Technology challenges underlying reasoning?	Technology is critically reflective?	Technology collects data?	Type of data collected by technology?	Can be used at the individual level?	Can be used at the team and/or group level?	Can be used at the organizational level?	Technology uses systemic viewpoint?	Action technology requires psychological health?
Action Research	Action Research Team.	Problem solving.	No.	Yes.	"What is the problem and how can it be solved?" or "Have you tried...?"	Sometimes.	Usually.	Sometimes.	Usually.	Yes.	All types (both qualitative and quantitative) as needed by the AR team.	No.	Yes.	Yes, but in a limited way (several AR teams).	Sometimes.	No.
Action Learning	Action Learning Set.	Insightful questioning.	Yes, called a "set adviser."	Yes.	"Have you considered the possibility of...?" or "Have you tried...?"	Yes.	Sometimes.	Yes.	Yes.	Yes.	Usually qualitative such as cases, life histories, or group interviews to share problems with the AL set.	No.	Yes.	Yes, but in a limited way (several AL sets).	Yes.	No.
Action Science	Action Science Group.	Competence acquisition and intervention.	Yes, called a "group facilitator."	No.	"What is your reasoning around...?" or "What were you thinking or feeling but not saying?"	Yes.	Sometimes.	Yes.	Yes.	Yes.	Usually qualitative such as individual cases or "maps" to share reasoning with AS group.	Yes, but only by experienced individuals in limited ways.	Yes.	Yes, but in a limited way (organizational defensive routines and maps).	Yes.	Yes, participants should not be in therapy.

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Action Technologies & Quality Management
Matrix

Table 2

	Useful in obtaining commitment by top management?	Useful in integrating Quality Management as part of the work process?	Useful in developing "win/win" relationships with customers and suppliers?	Useful in educating employees?	Useful in removing barriers to teamwork?	Technology is customer-driven?	Technology is data-based?	Useful in determining the need for Quality Management?	Can detect and/or identify implementation problems?	Can detect and/or identify utilization problems?	Can develop and/or identify solutions?	Technology has a built-in monitoring procedure?
Action Research	Yes, if a member of top management on AR team or if AR team reports to top management. No, if top management can ignore or override AR team.	Yes, especially if this is the question or problem the AR team is addressing. No, especially if the "false starts" by team require a lot of re-work.	Yes, especially if customers and suppliers are on AR team. No, if AR team ignores or overlooks customers and suppliers.	Yes.	Yes, AR team works together to solve problems. No, if team dynamics interfere.	Can be, does not have to be.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes, AR team.
Action Learning	Yes, if top management involved in AL set or sanctions AL process. No, if top management can override or ignore AL set.	Yes, if this is the problem brought to the AL set. No, if AL set is not addressing or unfamiliar with Quality Management.	Yes, even if customers and suppliers are not in AL set. No, if AL set never addresses or discusses.	Yes.	Yes, especially if teamwork is an overlooked issue. No, if AL set participants can not implement AL set's suggestions.	Can be, does not have to be.	Yes.	Yes.	Yes.	Yes.	Yes.	Yes, AL set.
Action Science	Yes, if commitment by top management is discussible. No, if commitment by top management or organizational defensive routines are undiscussible.	Yes, if organization is unwilling to determining why it is resistant to Quality Management. No, if AS group not addressing or unfamiliar with Quality Management.	Yes, this is one ideal of Action Science. No, if customers and suppliers are not part of the case or an issue raised by the AS group.	Yes.	Yes, if this is an issue in the case and the participants are psychologically healthy. No, if team barriers are undiscussible, if barriers based in psychosis, or one team member is psychologically unhealthy.	Can be, does not have to be.	Yes.	Yes.	Yes.	Yes.	Yes.	No.

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Action Technologies & Driving Forces of the Learning Organization
Matrix

Table 3

	Promotes creation of organizational climate conducive to Quality Improvement?	Facilitates re-engineering of processes through knowledge of workers themselves?	Useful in bringing about team integration and effectiveness?	Increases meaningful dialogue and self-directed learning?	Builds a sense of ownership and empowerment?	Encourages cross-boundary communication?	Induces critical discourse?	Creates environment of trust?	Promotes learning that occurs naturally and spontaneously?
Action Research	Yes, engagement and intensity can build sense of integrity with collective goal of AR team.	Yes, it can induce critical reflection/thinking by causing systematic addressing of processes by AR team.	Yes, AR design provides for systematic focus and team exploration.	Yes, embedded in the way AR is consummately performed with all input to the process carefully weighted and considered.	Yes, because broad involvement tends to be natural outgrowth.	Yes, through attention to AR team composition.	Yes, process is fueled by wide discourse and interaction.	Yes, intensity of inquiry places high value on individual contributions to group knowledge producing trust.	Yes, AR team usually eases into a natural iterative learning rhythm.
Action Learning	Yes, AL set empowers employees, creates climate of trust, and promotes critical/creative thinking.	Yes, when adequately sponsored by top management can cause in-depth and free ranging process mapping to occur.	Yes, occurs naturally, provided attention is given to AL set composition and latitude is given by the leadership structure.	Yes, inherently involves collaborative action and learning. If AL set has proper composition, then this should occur naturally.	Yes, outcome is a result of joint involvement with others and there tends to be a sense of keen ownership and joy in creativity.	Yes, encouragement of fresh questions and structuring of AL sets to include mixing of members, cross-organizationally involves a sense of boundarylessness.	Yes, can create a strong bonding effect among AL set members, opening up deep communication.	Yes, participants operate as equals and openly share their views leading to high trust.	Yes, learning is continuous and knowledge is widely shared.
Action Science	Yes, AS group in its design creates a mind set in a community of inquiry that probes factors that retard progress.	Yes, by its nature cause sharpen focus on events whose expected results were not achieved. AS group makes consideration of negative outcomes and criticism behaviorally acceptable.	Yes, allows for examining of unspoken norms, rules, information, value judgements, and assumptions as a part of the AS group process.	Yes, creates a climate in which deep dialogue and free communication of values is made possible by content self-selected by AS group members.	Yes, AS group members own their issues and reasoning and group participation empowers members.	Yes, group composition provides mixes and matches across boundaries which encourages challenging thinking.	Yes, AS group is based on critical discourse.	Yes, AS group members share privately held thoughts and feelings leading to high trust.	Yes, reflecting upon reasoning leads to systemic and unexpected insights.

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Action Technologies & Barriers to Learning Organizations*
Matrix

Table 4

	Changes mental models?	Overcomes learned helplessness?	Overcomes tunnel vision?	Reduces truncated learning?	Reduces individualism?	Reduces culture of fear and/or disrespect?	Addresses societal issues?	Capitalizes on diversity?	Reduces entrenched bureaucracy?	What is learned by participants?
Action Research	Sometimes, depends on the problem selected and the solution developed.	Sometimes, if the AR team is empowered and allowed to complete its' tasks.	Usually.	Sometimes, especially if the AR team is given appropriate time and support to learn AR.	Usually, especially if everyone on AR team is an equal member.	Sometimes, if this is the issue examined.	Sometimes.	Yes.	Sometimes, depends upon the problem addressed by AR team.	Process for iterative group problem solving.
Action Learning	Yes.	Sometimes, if the AL set addresses this issue and AL participants able to enact suggestions.	Yes.	Usually, especially if the AL set is supported with appropriate time and resources to learn AR.	Usually, depends upon the participants of the AL set.	Sometimes, if this is the issue examined.	Sometimes.	Yes.	Yes, AL sets use things in a new way thus reducing entrenchment.	Process for participants to experience questioning insight and to challenge each other's assumptions.
Action Science	Yes.	Sometimes, if the AS group examines the reasoning used to reinforce learned helplessness.	Yes.	Sometimes, especially if the AS group participants are given appropriate time and resources to learn AS.	Usually, depends upon the participants of the AS group, but AS strives towards collaboration.	Sometimes, if this is the issue examined.	Sometimes.	Yes.	Yes, AS groups examine reasoning leading to entrenchment.	Intervention techniques and tools for competence acquisition.

* Based on Marsick and Watkins, 1994.

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Looking at Bright and Dark Sides

The third and fourth matrices or road maps (Tables 3 and 4) answer the second research question in terms of looking at what supports the development of learning organizations. Borrowing from Kurt Lewin's concept of Force Field Analysis they look at "Driving Forces," the brighter side (Table 3) and Restraining Forces, here termed Barriers to Learning Organizations--the darker side (Table 4).

While Table 3 addresses Driving Forces and Table 4, Barriers to a Learning Organization, they both reflect in their own way the ability of the three technologies to overcome normal organizational barriers and capitalize on natural forces that can help advance organizations and learning. What threads its way through both tables is the freeing up of people to interact naturally without the traditional bureaucratic hindrances to creative thought. This is essential. It is both subtle and powerful, and it can be posited that proper use of action technologies can make the difference between a marginal Quality Management initiative and one that is truly successful. Principal properties that stand out and cut across the three related technologies are the ability to foster organizational integration, promote meaningful dialogue and focus collective energies.

Benefits of the Matrices and Leveraging Opportunities

Organizations can leverage their Quality Management programs and their human resources thereby enhancing productivity and output by strategically and appropriately using action technologies. The matrices can facilitate matching the available organizational resources with those needed to enact the action technology (time, staff, training, psychological health, etc.) with the desired level of participation (individual, team, organization, etc.), with the desired outcome (participation, problem-solving, critical reflection, learning, etc.), and identifying situations in which employees can become involved with the difficult issues facing an organization and participate in resolving them.

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Career Development Needs of Safety Professionals

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This study examined the career development needs of safety professionals. The respondents perceived that their level of expertise in the 35 ASTD/DOL trainer competencies was between basic and intermediate. None rated themselves as advanced in their level of expertise. They perceived their level of ethical practice needed little or no change in the future on seven ethical issues while indicating that some attention or change is needed for six of the ethical issues studied.

The safety needs of organizations continue to increase and become more important as safety needs, safety regulations, and other factors demand that employees develop and maintain their competence in a variety of safety-related areas. In order for safety professionals to provide the training needed, they also need to maintain their technical and professional competence as training professionals. What many hiring organizations lack is a systematic way to assess the professional competence and related career development needs of their members. At the same time, many professions including the safety training profession lack a systematic way for employees to assess and plan for their own career growth and development.

The American Society of Safety Engineers (ASSE) embraces the following vision for the safety profession as a field of study and of practice:

> The safety, health and environmental profession will be broadly recognized as accident prevention and environmental health authorities and problem solvers. Professional respect will be founded on an experience-based body of knowledge and a self-regulating organization with minimum qualification requirements and a strong code of conduct (Brauer and Townsend, 1994, p. 48).

Most safety professionals spend the majority of their time helping others change behavior, actions and performance to continually improve safety performance. The new behavior-based paradigm (as opposed to attitude-based) identifies the safety concept as a systems issue, not a personnel issue, that requires a system approach (Hidley and Krause, 1994). Among those system components are safety, health and environmental regulations, as well as other areas of safety-related technical competence. Yet, the acquisition of the skills and competencies required to develop and sustain effective training is a fundamental component of the system often overlooked or neglected by safety professionals. Instead, as can be seen in the ASSE vision referenced above, it appears that technical competence related to regulations and other technical safety considerations is often given priority over training competence. It is interesting to note that the ASSE does recognize the need for ethical conduct as indicated in the last line of their vision statement.

In today's learning organization, keeping functional, professional, and technical skills up-to-date is critical to professional effectiveness (Koonce, 1995) and career development. The American Society for Training and Development (ASTD) and the U.S. Department of Labor identified quality requirements for effective career development efforts in a study reported in Models for Practice (McLagan, 1989). Among the quality requirements identified are the opportunities for participants to focus on current strengths as well as development needs and the need for individuals to identify and seek appropriate developmental support.

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Greenhaus and Callanan (1994) define career development as "an ongoing process by which individuals progress through a series of stages, each of which is characterized by a relatively unique set of issues, themes, and tasks" (p.7). Some career development theorists use the Johari window as a framework for conceptualizing the disclosure and feedback process for personal growth. Emphasis is placed on what the supervisor as well as the employee knows and does not know (McMahon and Merman, 1987). This shared information between the employee and the supervisor is critical in helping to match the current and future needs of the individual to the organization. Effective career development of safety professionals presents a uniquely complex set of organizational challenges. The use of career development activities, such as the Johari Window, and studies such as this may reveal to hiring organizations and employees the need for safety professionals to enhance their competence as trainers.

This study was designed to determine the career development needs of safety training professionals in a three state area who are members of the American Society of Safety Engineers. The results should help universities, professional organizations, consultants and others to plan and deliver the career development activities needed by safety professionals.

Research Questions

This study was designed to answer six research questions:

1. What are the demographic characteristics of safety training professionals?
2. What are the perceptions of safety training professionals regarding the availability, accessibility, quality, and cost of available professional development programs?
3. What is the perceived level of expertise held in each of the 35 trainer competencies identified by ASTD and the U.S. Department of Labor?
4. What is the perceived level of personal need of safety professionals to raise their level of ethical practice in the future?
5. Does the perceived level of expertise (in the four major areas of competency) differ by years experience as a safety professional, by type of department in which they are employed, by whether the respondent was a certified safety professional, by type of training-related education received, or by time spent planning or conducting safety training activities?
6. Does the perceived level of personal need to raise their level of ethical practice in the future differ by years experience as a safety professional, by type of department in which they are employed, by whether the respondent was a certified safety professional, by type of training-related education received, or by time spent planning or conducting safety training activities?

Methodology

The research instrument was developed to answer the research questions identified for study and validated by a panel of Human Resource Development (HRD) researchers. The instrument contained four sections. Section A consisted of questions designed to determine the demographic characteristics of the respondents. Section B was designed to elicit respondents' perceptions of the availability, accessibility, quality, and cost of training programs designed for safety professionals. Respondents were asked in Section C to indicate their perceived level of expertise for the 35 trainer competencies identified by ASTD and the U.S. Department of Labor. In Section D, the safety professionals were asked to indicate the perceived level of personal need to raise standards of ethical practice for the 13 ethical issues identified by McLagan (1989) in the ASTD Models for Practice.

A completely random sample of 347 was selected from the population of 1,793 safety training professionals from Louisiana, Mississippi, and Alabama who were members of the American Society of Safety Engineers. Two mail surveys and a non-respondent telephone follow-up were used to gather the

data. Data were analyzed using descriptive statistics, inferential t-tests, and analyses of variance. The alpha level was set a priori at .05. A response rate of 47% was recorded.

In order to determine if non-response and late response bias existed, an analysis of variance was conducted for the five scale means by response wave (first mailing, second mailing, telephone follow-up). Since no significant differences existed in the mean competency ratings by response wave, it was determined that the responses received represented a truly random sample of the population under study and the mail and phone responses were combined for analyses.

Results

The results of the study are presented below by research question.

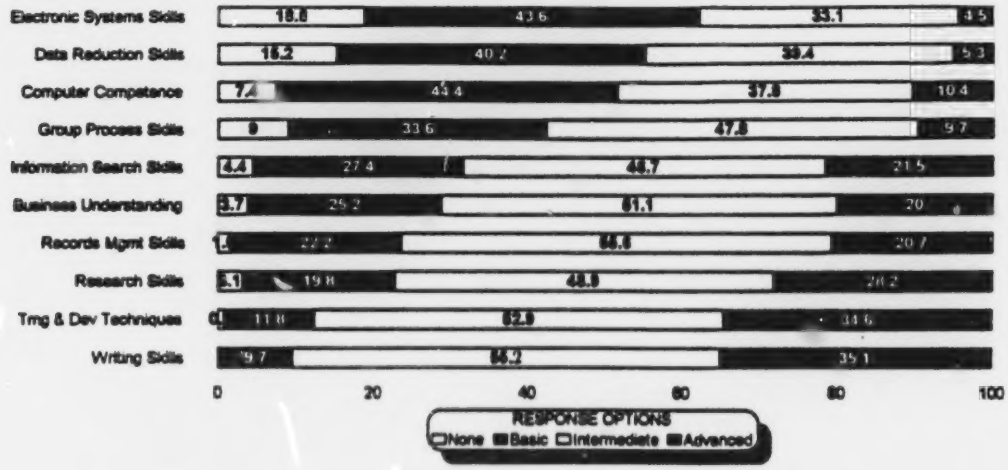
Research Question 1. Less than one-fourth (21%) reported they were Certified Safety Professionals. The respondents had been employed for an average of ten years with their current company and they averaged thirteen years of experience as a safety professional. Most (97%) were male and their average age was 43 years. Almost one-third (32%) spent one-fourth of their time on training activities while one fourth spent 50% (28%) or 75% (26%) of their time, Over one-half (54%) had completed a bachelor's degree and 14% had completed a masters degree. Two-thirds (63%) were in exempt positions. Almost all had participated in training workshops or seminars (93%) while over one-third had participated in training certificate programs (36%) or university courses in human resource development (43%). Almost all (92%) identified themselves as white with some identifying themselves as Black or African American (6%) or American Indian (2%). Over three-fourths (79%) identified the customers of their training as individuals in their own company or organization. They reported being employed in 11 different industries with the largest group (30%) working in the petrochemical industry.

Research Question 2. When asked how available professional development courses or programs were that enabled them to improve there HRD skills, the responses were distributed across the possible answers as follows: frequently available (21%), often available (26%), sometimes available (35%), and seldom available (14%). Over half (60%) were able to access the training programs with minor difficulty. Over half (58%) perceived that the quality of available training programs was good while only 1% felt the quality was poor. Over half (58%) perceived that the cost of available programs was reasonable while over one-fourth (26%) perceived that the cost was unreasonable and some (13%) felt the cost was very unreasonable.

Research Question 3. The safety professionals were asked to rate their level of expertise for each of the 35 trainer competencies identified by ASTD and the U.S. Department of Labor. The safety professionals perceived that their level of expertise in each of the 35 trainer competencies was between basic and intermediate. The competencies were rated on a four-point scale (1-none, 2-basic, 3-intermediate, 4-advanced). None of the safety professionals rated themselves as advanced in their level of expertise. The mean ratings of the competencies ranged from 2.26 (electronic systems skills) to 3.34 (subject matter understanding).

The responses to the ten "Trainer and the Training Environment" competencies are presented in Table 1 in order from the lowest to the highest rated skills. The highest ratings in this area were at the intermediate competence level. The highest rated competencies were research skills, training and development techniques and writing skills. It is interesting to note that the respondents rated themselves much higher on the training and development techniques competency than is indicated by their summated ratings of themselves on the 35 trainer competencies. The areas in which they rated themselves the lowest were electronic systems, data reduction skills and computer competence. They considered themselves to have basic competence in these areas. This group of competencies received the lowest ratings of the four groups with an overall mean of 2.79 ($\bar{x}$ = 0.5) on the four-point scale.

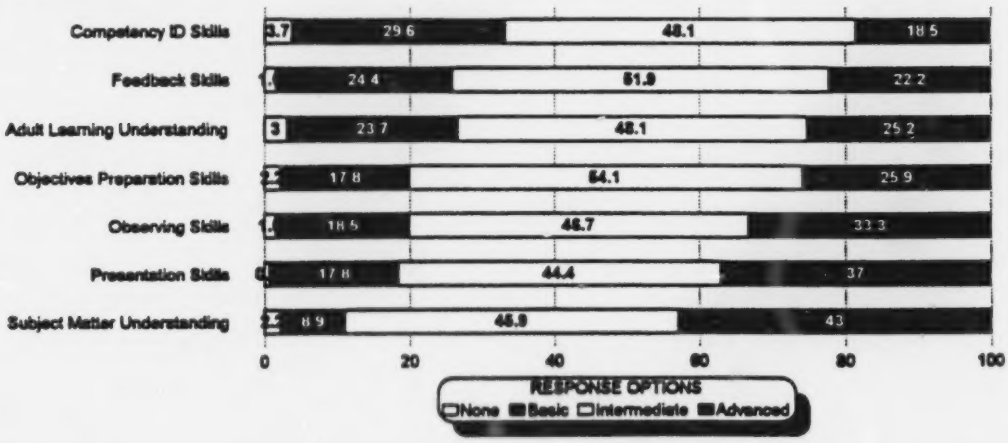
Table 1.
Levels of Expertise for the ASTD "Trainer and the Training Environment" Competencies as Perceived by Safety Professionals



The responses to the seven "Trainer as a Technical Expert" competencies are presented in Table 2 in order from the lowest to the highest rated skills. The respondents rated themselves with an intermediate level of competence and gave their highest ratings in this area to subject matter understanding and presentation skills.

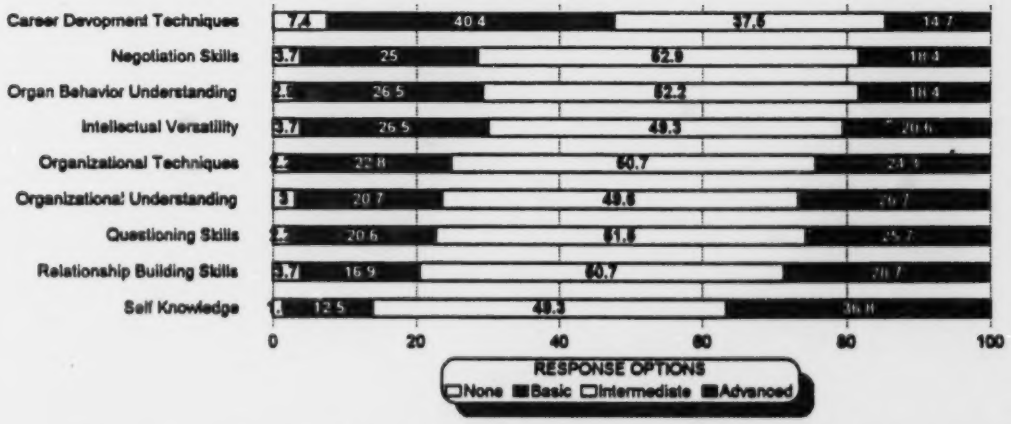
Their perceived competence in the area of subject matter understanding, the highest rated competency out of all 35 competencies, mirrors the emphasis on technical competence in ASSE's vision statement. They rated themselves the lowest, also with an intermediate level of competency, on competency identification and feedback skills. This group of competencies received the highest ratings of the four groups with an overall mean of 3.05 ($\bar{x}$ = 0.6) on the four-point scale.

Table 2.
Levels of Expertise for the ASTD "Trainer as a Technical Expert" Competencies as Perceived by Safety Professionals



The responses to the nine "Trainer as an Organizational Change Agent" competencies are presented in Table 3 in order from the lowest to the highest rated skills. The respondents rated themselves highest on self knowledge and relationship building skills while rating themselves lowest on negotiation skills and career development techniques. The low rating on career development techniques supports the theoretical foundation for this study presented earlier. All of the competencies in this group were rated at the intermediate level.

Table 3.
Levels of Expertise for the ASTD "Trainer as an Organizational Change Agent" Competencies as Perceived by Safety Professionals



The responses to the nine "Trainer as a Manager" competencies are presented in Table 4 in order from the lowest to the highest rated skills. The respondents rated themselves highest on industry understanding and coaching skills. They gave themselves the lowest ratings on cost benefit analysis skills and model building skills.

The low rating on cost benefit analysis skills is especially problematic in a business/industry setting given the need to justify the investment in training. Model building skills need to be strengthened because of the importance of the role of model building in the development of professional competence and training programs. All of the competencies in this group were rated at the intermediate level with the single exception of model building skills, which was rated at the basic level.

Research Question 4. The safety professionals were asked to rate their personal need to raise their ethical practice for the future on the ASTD ethical practice standards on a three point scale (1-needs little or no change, 2-needs some attention and change, 3-needs major attention and change). The respondents perceived their level of ethical practice needed little or no change in the future on nine of the ethical issues listed. They indicated that some attention or change was needed for four of the ethical issues listed and they indicated that none of the issues needed major attention or change. The competencies needing the least attention were avoiding conflicts of interest and maintaining appropriate confidentiality.

The issues that needed the greatest attention were:

- Balancing organizational and individuals needs and interests.
- Ensuring customer and user involvement, participation, and ownership.
- Being sensitive to the direct and indirect effects of intervention, and acting to address negative consequences.
- Making the intervention appropriate to the customer's or user's needs.

Table 4.
Levels of Expertise for the ASTD "Trainer as a Manager" Competencies as Perceived by Safety Professionals

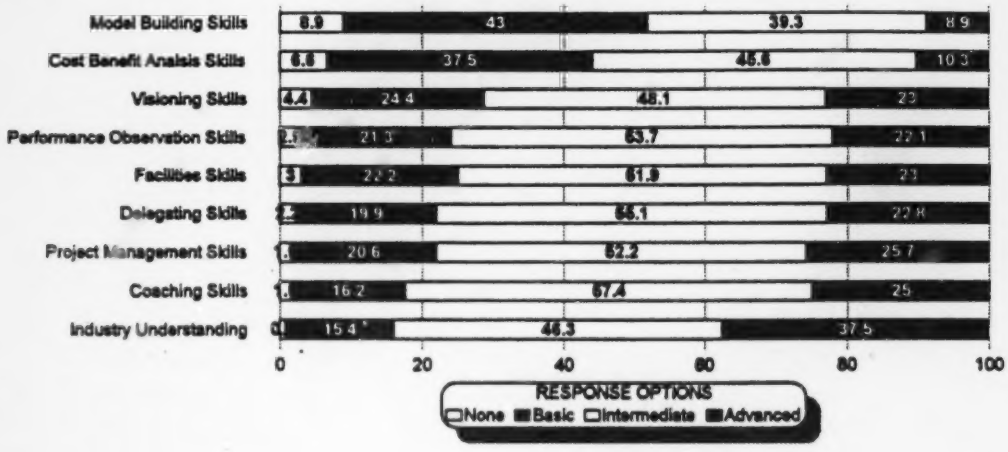
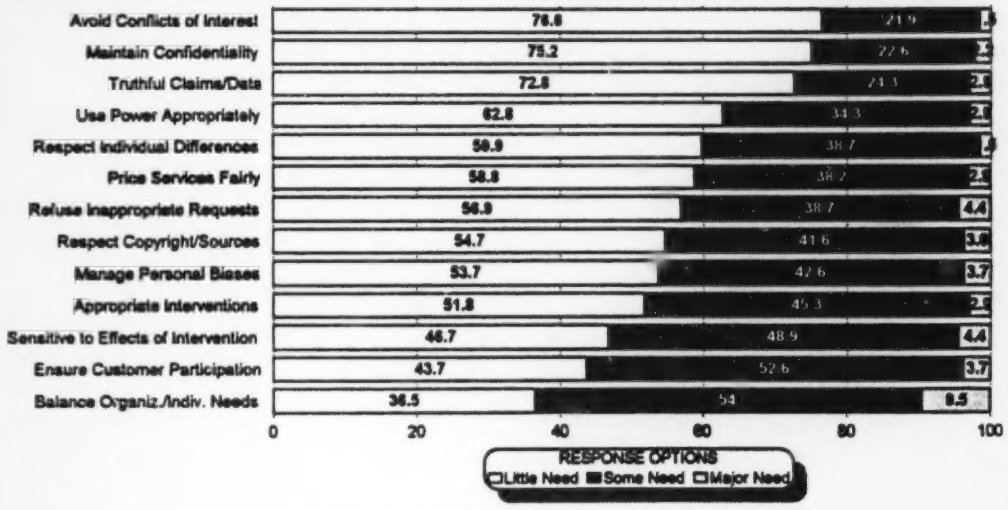


Table 5.
Need to Raise Personal Standards of Ethical Practice as Perceived by Safety Professionals



Research Question 5. The analyses of variance revealed that the safety professionals' perceived level of expertise in the area of technical expertise differed significantly by the type of department (training, safety, safety & training, administration) in which they worked. Those who indicated they were employed in administration rated themselves significantly higher than those who indicated they were employed in a safety department. No differences existed between those who were employed in either a training or a safety and training department, and those who were employed in administration departments

Those who had received a 50-100 hour certificate program and those who had completed at least one HRD course rated their competency level on all four competency areas significantly higher than those

who had not. Those who had completed a four year degree in human resource development rated themselves significantly higher on trainer as a technical expert competencies than those who did not have this degree. It should be noted that this analysis was based on only eight individuals in the sample with a HRD degree compared to the rest of the sample. No significant differences existed by whether the respondent was a Certified Safety Professional, years experience as a safety professional or by time spent planning or conducting safety training activities.

Research Question 6. The need to raise their level of ethical practice differed significantly by the type of department in which they were employed. Those who were employed in administration rated themselves higher in their ethical practice than those who were employed in safety and training departments.

No significant differences existed by years experience as a safety professional, whether the respondent was a certified safety professional, or by time spent planning or conducting safety training activities?

Conclusions and Implications

Even though the average safety professional had been with their company for almost ten years, they had very limited experience as safety professionals and it appears that they were not hired initially as safety professionals. This conclusion is supported by the finding that the average respondent had worked as a safety professional for less than three years.

Even though all of the respondents were safety professionals, most function as safety professionals on a part-time basis which indicates that safety training is just one of their responsibilities. This conclusion is based on the finding that 86% spend one-fourth, one-half or three-fourths of their time on safety training. Only 14% conduct safety training on a full-time basis. Almost all of the respondents worked as in-house safety professionals. Continuing education is valued by safety professionals as indicated by the finding that all safety professionals have participated in one or more types of formal training.

Professional development courses or programs are accessible in terms of distance to course locations but they are not as available as safety professionals would like. Safety professionals would participate in more human resource development courses and workshops designed for safety professionals if they were offered. Most safety professionals believe the quality of available HRD programs is good or excellent and the programs are offered at a reasonable cost. University HRD programs can use this information in evaluating the potential for future programming and in the continuous improvement of existing programs.

Safety professionals possess adequate levels of professional competency but major improvements are possible and should be pursued. Safety professionals currently lack advanced expertise in any of the training competencies. This confirms the need for university HRD programs to offer career development opportunities designed to increase the levels of expertise possessed by safety professionals.

Safety professionals who have completed training workshops or an HRD course have higher perceived training competency levels than those who have not. However, Certified Safety Professionals do not have higher perceived training competency levels than those who do not hold the CSP credential. These conclusion imply that the focus of the CSP certification process is on technical safety competence rather than on training competence.

Major changes are not needed in safety professionals' standards of ethical practice. It appears that ASSE's commitment to a strong code of conduct as stated in their vision statement may have contributed to this finding. However, some attention or change is needed in some of the ethical areas. These areas should be targeted by HRD programs as they plan future programming for safety professionals.

This study addressed the career development needs of safety professionals; conclusions and implications cannot be drawn for groups beyond the population studied. However, it is reasonable to believe that the status of other training professionals may be similar to the status of the safety

professionals reported in this study. University HRD researchers should conduct additional data based studies of other groups of training professionals to determine if their characteristics and needs are similar to those of the safety professionals. If these characteristics and needs are found to be similar, university HRD programs could use this information to build a model to serve a more diverse clientele. This may also necessitate differentiated levels of programming for entry level and experienced safety professionals in the future as university HRD programs develop and expand..

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Instructional Design in the Context of Situated Learning

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Situated learning theory appears to contain important implications for the both the conduct and teaching of instructional design. This paper examines some of these implications and reports on an action-research study in which the instructor sought to situate a graduate level course in instructional design in a real-world context. Results and thoughts on the study are discussed here.

While recent publications in the area of instructional design (ID), e.g. Rothwell & Kazanas (1992), continue to support the idea of ID as a linear, abstracted and mechanical process which can be "learned" first as a system and then later "applied" in various worksite settings, new theories of learning and action raise critical questions about the whole business of application and in so doing force us to rethink the importance and place of ID theory within the HRD enterprise. The purpose of this research-based paper is to analyze the new thinking and use it to begin to refocus our thinking around the ID process.

Situated Learning and Action: A new environment for Instructional Design theory

The problems faced by current ID theory derive from two separate lines of thinking, though it is possible to discern connections between them. The first falls under the heading of situated learning and describes the latest thinking of Jean Lave and her colleagues about the nature and "locus" of learning. The second falls under the heading of situated action and describes work by Lucy Suchman and John Seely Brown around the nature of expert and everyday actions, particularly as these have to do with the use of machines.

The essences of the various positions appear to be these. According to Lave's recent work (Lave & Wenger, 1991; Chaiklin & Lave, 1992), learning is not some internal cognitive process according to which the individual moves from a state of relative unknowing to a more complete state of knowledge of a particular set of objects. On the contrary, the point is stressed again and again that learning is essentially a socially situated process, defined as "coparticipation" in a "community of practice" (from the Preface to Lave and Wenger). The learner within this discourse becomes a "legitimate peripheral participant," in essence an apprentice who picks up, internalizes various ideas, skills and attitudes within a context peopled by experts whose behavior and understanding of skill the learner emulates and interprets.

Lave downplays the role of the school (college or university) in the transmission of knowledge, preferring instead to focus on "social practice," in the characterization of which learning plays a central and undisputed role. Though the concept of "situated learning" says nothing about the role of ID in the learning process, it clearly suggests that the traditional role of systematic, plan-based ID and how we transmit it as professors and practitioners must be rethought. At the very least, it reasserts the importance of on-the-job training, implying that what trainers bring to situations of learning are not the "normal" groups of skills so beloved of organizations like ASTD. Finally, the emphasis on co-participation carries with it the idea that if learners learn by virtue of their involvement in communities of practice, then the role of the group in promoting learning becomes more than a good idea. In essence, there is no learning without the group.

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Suchman's work is more obviously about ID, a point made very convincingly by Michael Streibel (1989) in a recent review of her thinking (Suchman, 1987). ID is about plans; what we intend to do and how we intend to do it. The question Suchman asks and which Streibel paraphrases is this: "Do human beings, such as teachers and learners, follow plans. . .when they solve real-world problems or do [they] develop embodied skills that are only prospectively or retrospectively represented by plans?" The answer they give is that plans (and by direct implication ID) are essentially "social constructs", accounts of rules which we tend to invoke when we there is a problem or we otherwise feel a need for them. Plans imagine a future of a certain kind or rationally reconstruct a course of action already followed. If that is how plans work in real situations, what does this say about the role of systematic ID in the creation and development of training interventions?

A recent survey of ID theories and prescriptions argued that rather than following or applying good, standard models of ID already developed, practitioners tend to make up their own models as they go along, thus appearing to add to an unnecessary superfluity in this area (Andrews & Goodson, 1980). If Suchman is to be believed, such proliferation is not only inevitable but almost a necessity, precisely because ID represents an "embodied" or situated skill, a set of actions which people take in certain situations when conditions demand it, and in which plans such as ID models operate as useful resources, aids to the successful outcome of a learning experience but by no means casual or necessary for successful action to occur.

Situating Formal Learning: Experimenting with a graduate level course in ID

This paper will argue for a rethinking of ID based on the arguments and theories implicit in the work of Lave and Suchman. It contains implications not only for the role of formal ID theory in the actual conduct of training but almost as importantly for the way we teach ID in graduate HRD programs. As a result of my readings in this area, I redesigned a university-based, graduate-level ID course by replacing fictional scenarios of training problems with two real world situations which I asked students to respond to by designing training interventions. Data were gathered from class participants and later subjected to qualitative analysis. Preliminary results from this study are reported here.

VAE 484/884 is a graduate-level course within a Masters of Arts degree in Adult and Continuing Education, which has an institutionally-recognized minor in Human Resource Development. When I first began teaching this course five years ago it had a course number associating it with an existing course on needs assessment. Partly because of this and partly because of my own beliefs about the importance of the topic, the orientation to needs assessment was retained when the course became "The concept and design of training." More recently, with the approval of the minor in HRD the course became "Instructional Design in HRD."

Despite the explicit link with business and industry, over the years organizational settings other than business and industry have characterized the students' occupational or professional backgrounds, and this has had a bearing on how I have approached curriculum design. For example, it has meant spending less time providing a background on the nature of the training enterprise as it is encountered in the business and for-profit sectors, while talking in more general terms about the process of training. It has also meant that terms like trainer are often less appropriate than, for example, staff development professional and the like. As an orientation to the course, I share, the first night of class, some of my epistemological assumptions. You learn best by doing, I would tell students, by applying and by getting involved with the material. Second, you learn incidentally by doing (so that the learning agenda is also being served by the carrying out of the typical tasks one associates with training or instructional design), and by reflecting on that doing. [Theoretically, this approach has more in common, at least in my own mind, with "active learning" constructs (e.g. Bonwell & Eison, 1991) than with, for example, the work of Kolb, applicable and popular though this may be]. As a result, I explain, case studies or training scenarios are productive ways to pursue learning objectives as they capitalize on this emphasis on doing, while tapping, hopefully, individual students' experiences in the workplace.

[Recent work on project-based learning (Blumenfeld et al., 1992) has reinforced my commitment to the use of this pedagogic methodology.] Finally, in my current approach to the curriculum, I draw on constructivist sentiments, at least for my espoused theory. Specifically, I emphasize "situating cognition in real-world contexts, teaching through cognitive apprenticeships, and construction of multiple perspectives" (Duffy & Jonassen, 1992). The issues for actual classroom practices which these principles surface I will leave for the discussion section and symposium interaction.

Until the spring of 1994, students approached the subject matter of curriculum design via scenarios which described organizational contexts, presenting problems and an outline of the task requirements. Students formed groups of varying sizes, from three to six, and spent the semester designing a relevant training intervention response. As a vehicle for communicating their deliberations and approach, we drew on a reporting format, the "program specification document" developed by Kay Abella (1986). The idea of having a model of how the final report should look came early in the course's development as students expressed varying degrees of anxiety in the absence of a vision of the finished product.

Incidentally, this appears to be a problem with many ID models, even when, as in recent "definitive" texts, e.g. Rothwell and Kazanas (1992), they are based on national "standards." Abella's was the only approach we have found (though we have not set out to establish her as the authority in this area) which seems to take account of the day-to-day reality of putting a program together and creating the necessary mechanisms to make sure that all of the relevant parties are kept in the picture. In the context of the present discussion, this makes Abella's approach much more situated and contextual than more theoretically grounded and sophisticated models. The continued emphasis on a "systematic" approach to ID, an approach which smacks hugely of positivistic optimism, is still the norm, as witnessed by the subtitle of Rothwell and Kazanas's ambitious text. And yet, astonishingly, there is little in this pure theory-driven approach which can act as a guide for how to proceed: what are specific steps one may take to create the necessary links between the different components of the ID domain. One is still left to struggle and trust in the integrity of one's own "embedded" skills (Suchman, 1987), skills which surely are susceptible to inquiry, even as they are transmitted between generations of practitioners.

The Present Study

In the spring of 1994, I based the teaching of VAE 484/884 on two "real" cases. I had approached members of the university community about the idea of having my ID class design a training program based on a current problem or need. The result was a request to develop a leadership-based program for undergraduates to be taught through the Office of Student Affairs at the university and, second, to recommend a solution to the non-use, by engineering technicians, of a computer-driven (CNC) machine for crafting tools needed for special projects in the university's College of Engineering. Thus one project dealt with the "soft" skill areas so commonly encountered by trainers, while the other was of a highly-technical nature.

The class of thirteen was divided into two, with each group headed by a coordinator-facilitator, who was also a student in the class and with whom I met once a week for discussion and debriefing. I should mention that complicating this overall design was the fact that the student coordinator of the engineering group was also the chief technician of the unit in which the CNC problem was located. As it turned out and as discussed below, this double-role had significant impact on the unfolding of the group's project.

In the second half of the semester, I asked one of the students, a doctoral advisee of mine, to conduct open-ended qualitatively-oriented interviews with each member of the class to ascertain how they found working on the project and how they thought the class was going. Specifically, I wanted to get a sense of how and what they were learning and how they were feeling--their motivation--at different stages in the accomplishment of the training design. It must, of course be remarked, that despite assurances of confidentiality, due to the nature of the study and the small sample size, study participants knew that I would be reading typed transcripts of their taped

responses and thus could be expected to be less open and revealing about their feelings than if the chief investigator--myself--was unknown to them. My interpretation of findings must be judged in this light.

How did the process of having students working on real life, real time training problems work itself out? In more theoretical language, was I creating a situated learning experience within a formal learning context? And, if this was the case, how was my intervention or "treatment" experienced by students? How did they assess the quality and degree of learning which occurred and how motivated were they by the experience?

Situated learning in the context of a classroom. In a single major respect, and speaking subjectively, the class was successful. Let me elaborate. Deep down, I am of the persuasion that when real learning is going on, the commitment, focus and excitement level of learners is high; students commingle and become parts of a vitally synergistic whole, while the teacher has almost disappeared, an important "crutch" at the beginning but unnecessary as learners gain in confidence and competence Grow, 1991). To some degree this happened. Normally, the class met for one evening, once a week. Once the projects got going, the two groups began to meet outside of the normal class hours and towards the end of the semester would often meet up to an hour before the commencement of class. I recall one occasion when I told the groups that we should convene at the normal class time, 7:00 p.m., once they had completed their deliberations. Seven came and no one showed up. Then it was 7:30. Finally, I had to go out and call them in. I had begun to feel lonely and unnecessary sitting there in the classroom, the chairs empty, the overhead projector emitting a disquieting white noise in the middle of the room. In some essential fashion, the learning had taken over and the need for the instructor--even as guide and coach--had all but disappeared. The class did not need my permission to take responsibility for their own learning. The project, <u>their</u> project, had become the driving force of their learning.

Obviously, this single event does not capture the full measure of the experience. (Moreover, my evaluation of this apparent reality was somewhat naive as can be judged from the report of data below.) In important respects the class did not achieve unstated if clearly implied objectives. For situated learning to "work" as a tool in graduate education, it can be argued, it must be possible to see theory in action and to have the opportunity to reflect on process as it unfolds. In important respects then, artificial constraints must be built into the experience which, while providing an opportunity to validate or "reconstruct" the learning which has occurred, nevertheless run counter to the experiences of many trainers faced with real life tasks and assignments. Put bluntly, in real life settings, reflection on learning may be--ARL teams aside--a seldom sought, seldom provided luxury. In formal learning environments, without such reflection it would seem contradictory to call it a class. Of course, the question of whether such reflection on learning experiences occurs with any regularity is as much an empirical as it is a conceptual one, to be examined and discussed in the light of research rather than rhetoric.

As I had originally conceived it, teaching ID in the context of real projects meant providing doses of formal knowledge, mostly at the beginning of the class period. Such knowledge, e.g. about how to conduct needs assessment or what is motivational in instruction, was then somehow to be "applied" by the students working on their projects. Early on, however, it became clear that JIT theory presentation could be not synchronized with project development. Almost from the beginning, the nature of the project as well as the nature, competence and maturity of the student-trainers dictated a class structure, whereby theory would almost always be more abstracted and independent of the individually grounded scenarios they were responding to. In other words, once the projects got underway, even the role of guide and coach was under strain, with the instructor becoming more of a <u>consultant</u>, someone to go to with problems or when an impasse had been reached, a problem solver rather than a guide or coach promoting learning.

From this follows many conclusions, among which I would highlight the following. Even in so-called "introductions" to ID, there is a strong element of artificiality. Though class time can never permit more than a rudimentary exploration of the real-time dimensions of a training intervention, nevertheless the myth persists than somehow the pieces are linked: that there is a real-time, more or less logical link between the various components of the "model"--from needs

assessment to objectives, from methods to evaluation and beyond (Andrews & Goodson, 1980; Gilley & Eggland, 1989; Rothwell & Kazanas, 1992). While the desirability of systematically relating discrete operations into a seamless whole may be unarguable, from the perspective of formal theory we are starting from a premise that such linkage is the norm even if rarely followed in practice: that the theory is good but that reality falls short. Apart from the academic dubiousness of this perspective, it cannot be fail to do justice to the nature, control and expression of our individually embedded practices and skills, and ultimately to the true nature of practice and expertise. In a word, one teaches ID one way; it works another. As Suchman has noted, models or (ID) plans "abstract" away from experience and may be useful for that reason; they may simplify reality and allow us to address important dimensions of that reality in our thoughts and evaluations. But it is far less clear either that they direct our activity as practitioners or that they should.

The Students Respond. Data from the qualitative interviews is currently undergoing analysis. Initial summary findings are offered here under a number of headings, reflecting interview questions.

Agenda. Though the protocol question (Could you state your agenda for this class?) was perhaps too pointed, the responses, even from a small group (n = 10), seemed odd. They suggested that students saw the class either as helping them clarify or determine if they were in the right field ("if HRD is right for me") or as providing them with the basics and the theory ("literary background", as one student put it) necessary to function as trainers. In other words, the class would either do something it was not designed to do or would teach them theory and research rather than how-to. Apart from seeming to run counter to ideology (that adult learners come to learning contexts with application and problems in mind), this initial orientation could pose a problem for what lay ahead.

Thus, while I came into the class trying not to make it introductory but to plunge them into a real situation in which they would get a change to get their "feet wet", they seemed to be saying either that they didn't care what the class was about, only that it was about something to do with the field of HRD, or that they preferred theory (with limited and controlled amounts of application).

Project as test of knowledge. There seemed to be general agreement that the project was a more meaningful test of conceptual knowledge than paper assignments or tests. Asked if they felt that they were in a better position to design training programs as a result of a "real life context", there appeared to be a strong belief in personal readiness to act as a designer. These findings are however subject to strong qualification. One student suggested that though the project had been designed to solve a real life problem, nevertheless it remained a "paradigm" or "framework", and thus still "academic" and "theoretical". This student was working at the time with a consultant who was "actually out there doing this" and who wouldn't "want to have anything to do with" the models being presented and tested. So, despite the apparent introduction of reality, there remained "two worlds" which could not be reconciled. At the same time, being real carried problems of its own: "because you're dealing with real life situations", noted the same student, "there's even more of a stress to make this perfect. . .and if you will, your name is on the line."

Though the conclusions must remain tentative, we were beginning to see emerge a set of ideas which suggested that while the introduction of "reality" to the formal learning environment could be motivating and compelling in its own right, it also brought dangers and anxieties. The fact, as it turned out, that I, the instructor--the "master" (Tripp, 1993)--was not there "for them" as much as I had presumed I was created an environment where the real world tended to overwhelm the learning. In retrospect, the need for safety and comfort, the need to practice where it won't be costly, seems to push learning towards the artificial where students are held responsible for a more limited set of actions, and become, in Lave's words, legitimate but peripheral participants.

Knowledge Sources. Students discussed the value of finding knowledge within themselves, though they were mostly new to this area of professional practice. At the same time, there were expressions of ambivalence about the place and status of (learning) theory and the need for more

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instructor input. At times, it appeared as if there was a clash between the concept of knowledge based on the motive of coming to class to acquire basics and the idea that the instructor was not or was not allowing himself to be portrayed as the sole source of expertise and wisdom. In other words, if you came to class for "the basics" then of course you couldn't be presumed to know these and the instructor, who does, must be the expert. If, on the other hand, you permitted the instructor to push you towards the knowledge and expertise he believed you already had, you experienced the thrill of knowing you knew while being disappointed that perhaps you had the basics all along and thus knowledge was not the elusive entity the motive for taking the class seemed to rest on.

In conclusion, again though very tentative, the manoeuvering around classroom tasks and assignments is only partly about involving the student in his or her own learning, only partly about activity and action. It is also singularly about where you believe fundamentally knowledge comes from and what it means to "have" and be able to "use" that knowledge. The idea that it comes from within carries hints of the Platonic embrace of memory as the source of knowledge, already strongly implicit in the concept of experiential learning. Situated learning seems to push away from this locus, even as adult learning theory pushes it away from the instructor. Where then does knowledge or learning reside, if not in the environment? The answer seems to be none of these and all of these. Though there is no data from this study to support this line of reasoning, it echoes recent discussions of ID in the context of situated learning (Young, 1995):

> From this view [that of situated learning], remembering arises through interactions with the environment, and the concept of memory becomes non-existent or irrelevant to an explanation of knowledge and learning, replaced by an emphasis of the tuning of attention and perception; that is, perceptual learning. (p.44)

Motivation. A burgeoning literature on classroom learning has shifted attention from the merely cognitive dimensions of knowledge acquisition to so-called "hot" dimensions such as motivation, values, interests, self-efficacy, control and the like (Pintrich, Marx, & Boyle, 1993; Courtney & Speck, 1994). I was particularly interested in how this experiment in situated learning affected student motivation and how the latter in turn seemed to effect learning. Students reported a patterned array of highs and lows (though we inadvertently biased responses through our question: "How motivated were you in this class?" followed by "Have their been motivational highs and lows?"). Highs were associated with getting started on the project, putting it together or seeing how it was coming together, a sense of completion, things clicking, applying class readings to parts of the project, and the like. Lows were mostly associated with group work: conflicts within the group, the issue of compromising on ideas and solutions, the pressure of completing the project within a pre-set time, along with the fact that the project had to be presented to a real client.

In retrospect, I was less in touch with the groups and their frustrations and anxieties than I might have been. For example, in the Engineering group, it soon became apparent that the leader-facilitator--who was also the client--brought an unfortunate mix to his work. He already had his own solution to the problem and so was reluctant to accept the group's decision. More importantly, perhaps, he was--from my observations--amazingly passive as a participant, and never really functioned as a facilitator. Though his normal job is that of supervisor in a unit of engineering technicians, in this context, he seemed very unwilling or unable to lead. The fact that the class group was made up entirely of women, while his work group is exclusively male probably may have had something to do with his style of leadership, though the unfolding of this issue was not dealt with in the interviews. The result for one member of the group was plainly disturbing. She reported how

> a funny thing happened, part of the group had met on their own and kind of changed the track of the group, so I happened to run into them at the library while they were working on something and I kind of sat down and made myself at home. But it was frustrating for me because if I wouldn't have been there at that time, I would have missed out on that part.

In this particular context, the situating of the learning depended on there being groups. At the same time, various theories strongly imply their importance because of their ability to provide

multiple perspectives, because they represent the community of practice, and so forth. However, in this instance, it seems clear that a kind of quasi-tyranny took over, with some members, particularly as deadlines loomed, determined to push decisions through quite undemocratically and in some cases to physically exclude members who were perceived as contributing to the final outcome.

Primary complaints. As might be expected major complaints by class members had to do with the "considerable" time needed outside of the class in order to complete the projects. Compounding this, my decision, which I thought I had discussed adequately with the class, to shift the deadline when a preliminary report of the project was due seemed to cause more confusion and stress. Group members were geared towards particular deadlines, no matter how unrealistic--which they were. Though evidence is not strong here, it is possible that by shifting the deadlines I was reminding them of the importance of real life parameters to the project, at a time when they would have been willing to accept that the project ultimately was not going to make or break them, and that, this, after all, was still a class, and not real life.

Some Conclusions

The current situation contains room for both danger as well as excitement. We appear to be sitting at a time when the jury is out on the practicality of situated learning as a philosophy of pedagogy even as the theoretical literature is unequivocal in its embrace of the concept. Children and workers learn most effectively the practical knowledge they desire and need in contexts of use (Brown, Collins & Duguid, 1989). Learners learn in communities of practice (Lave & Wenger, 1991). Schooling is not merely suspect (Resnick, 1987) but probably irrelevant, if not wrong (Balfanz, 1991; Lave & Wenger, 1991). Given that schools, colleges and the like are not going to go away soon, how then are the institutions of learning to change to accommodate the new realities? Suchman, Brown, Streibel and others have been strong on the critique and the careful enunciation of theory. What is the solution? Lave more or less dismisses the school as at best a distraction from the focus on communities of practice. Others have attempted to salvage the classroom while criticizing the opposition for being vague or utopian on practicalities (Tripp, 1993). But if the critique by Suchman et al. is to matter, then there can be no denying that situated learning and situated actions are concepts which contain quite radical implications for classroom practices. It is not simply that lectures do not help the learner because they are too dull and s/he is too passive in their presence. The notion of learning as a process and product of community practice turns notions of transfer and application on their heads, and have much less to do with the brilliance of the instructor.

In this study, I attempted to bridge the gap between the formality of the classroom learning environment and the authenticity of real life problem-solving and decision-making. In trying to make the artificial authentic, it seems to me that my students were overwhelmed by the real world in a way which complicated learning even while they acquired pockets of information. In some cases, it seemed to be more "lessons" they were learning about life itself than it was the results of reflection and theory-building about the subject of ID. But did they need to go to the university to continue the bumping up against a reality which characterizes their daily lives as adults? Does academic learning and knowledge serve to make their lives and jobs harder precisely because it is formal and abstracted from the real world or is it that very abstraction and removal which is the sought-after respite from a world too overwhelming in its nowness and thereness, a world from which we ought to be able to get away in constructive forms of play, one form of which is academia and its solitude of knowing?

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A MODEL FOR DEVELOPING FOREIGN LANGUAGE HRD PROGRAMS

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Using a four decision-point scheme based on the curriculum theory of Houle (1976) as a data analysis instrument, the authors studied over 30 successful foreign language programs in business, government and education. Their analysis resulted in a model for corporate foreign language programs.

The rapid growth of international trade in the last fifteen years has resulted in a renewed interest among U.S. multinational firms in developing foreign language capabilities of their employees. According to Inman (1985), U.S. companies have traditionally contracted with commercial language schools (46.3%), private individuals (14%), academic establishments (7.4%) or implemented their own in-house training programs (12.3%). However, the hours devoted to language training in these latter programs averaged 108.5 hours (Inman, 1985) or less (Seabrook and Valdes, 1988); whereas successful programs with long histories and considerable research support include many more contact hours (Beneke, 1981; Nolan Grynspan & Kline, 1984).

In spite of these programs, American firms continue to experience a 25-40% expatriate failure rate, compared to a failure rate of only 10% for Japanese expatriates (Hogan & Goodson, 1990). Harry Obst, Director of the Department of State's Office of Language Services, is quoted as saying, "...the American ignorance of foreign languages and cultures is costing the U.S. over $50 billion a year (Wolniansky, 1989)."

In sharp contrast, Japanese firms invested much more time and massive sums of money for in-house language training (Holden, 1989; Horton, 1987). Like the Japanese, European firms such as Siemens AG and BASF AG Chemical Corporation have made a serious commitment to language instruction, providing 144 to 400 hours of in-house instruction (Basta, 1991; Monahan, 1989; Freudenstein, Beneke & Ponisch, 1981). These findings suggest that proactive and committed in-house programs are more effective than reactive, short-term contract solutions to training.

This paper proposes a model for developing effective foreign language training programs within the business and industrial settings. The model is based on an extensive review of the literature describing current language training programs within business, academia and the government sectors. By identifying elements common to programs known to be successful, and by selecting and generalizing curriculum innovations from successful programs, the authors have developed what they hope is a useful model for designers of foreign language training programs in multinational firms in the host country.

Methodology

Houle (1976) devised a curriculum development model based on various decision points from the identification of an educational activity to the "measurement and appraisal of results (Houle, 1976 p. 54)." Although Houle's complete model includes both major and subordinate "decision points," the authors of this paper were concerned only with the following decision points:

1. The identification of a learning/training need
2. The setting of goals and objectives
3. Program design including methods of instruction
4. The evaluating or assessing of training outcomes

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The analytic paradigm described above was utilized to gather data from various successful programs described in the literature. In addition to reviewing exemplary cases described in the literature, the authors conducted field observations in the U.S., France and Central America. Both empirical cases and those found in the literature were selected from the three different settings of business, university and government agencies.

Results of the Study

The identification of a learning/training need. The most sophisticated examples of needs analysis among in-house training programs were found in Europe. Clearly, the ultimate goal among these companies was to benefit the organization. On-site training programs, even without permanent staff assigned as language trainers, were able to form teams of managers and, when available, expatriate employees to conduct thorough needs analyses. Often, the best data for guiding the design of a training program was judged to be obtainable only from those who had experienced working abroad, especially from those who had failed in their assignments in the sense of having to return early. Particularly successful were programs such as one conducted by Credit Lyonnais which had a full-time language expert as part of the company team, an individual who also had a deep knowledge of the corporate culture and had immediate access to changing information related to company, job and trainee language needs (Finel-Honigman, 1986).

Ford-Werke used a three-level needs analysis. Conducted by in-house experts, the analysis included 1) needs identified as company-wide, related to overall goals of the firm and related to specific corporate culture; 2) department and job specific language needs; and 3) employee language needs. From these three levels of needs, Ford-Werke formulated performance objectives for each employee (Thelen and Reinhold, 1981). The Association for the Exchange of Experiences on Foreign Language Teaching in Industrial Firms (ERFA or Erfahrungsaustauschring Fremdsprachen in der Wirtschaft) identifies a fourth level--the needs of the trainee's family (Ponisch, 1981). ERFA companies then provided whatever training they considered necessary for family members. Biersteker (1986) suggests the use of the ACTFL oral interview as an instrument that might be used in assessing individual employee needs.

If European exemplars such as the ERFA group and Credit Lyonnais could be considered at one end of a continuum, academic programs, even the most exemplary, should be considered at the opposite end of the needs analysis continuum. Although academic programs such as the Languages for International Professions Program (LIPP) at Arizona State University conducted extensive needs assessment surveys, these surveys often resulted in general lists of business needs gathered from a variety of professionals employed in different organizations (Guntermann, 1984a). This inventory of functions, knowledge and attitudes effectively served the purposes of an academic program designed to prepare students for a variety of possible occupational settings, but the LIPP approach may not provide the most appropriate information on training needs for a specific company. Academia's unfamiliarity with a particular corporate culture and specific job requirements together with its physical isolation from business settings set this approach to needs analysis at the opposite end of the continuum.

The setting of training goals and objectives. Training program goals and objectives were determined in all of the exemplary cases by means of thorough and detailed needs analyses. Each identified need was matched with a set of specific learning outcomes. Obviously, those programs which had conducted extensive needs analyses were better able to identify clear learning outcomes. The ERFA group responded to a survey identifying program goals and objectives. ERFA described the general goal as the development of language performance and behavior competencies appropriate for a variety of professional and social situations (Beneke, 1981). The LIPP at Arizona State formulated its goal as the development of communicative proficiency within social and professional functions and contexts. The Foreign Service Institute defined its general goal as "functional effectiveness as well as linguistic correctness (Crawford, 1983, p. 3)." ERFA identified specific objectives within the linguistic

framework of understanding, speaking, reading and writing. They combined this linguistic framework with priorities emerging from specific task analyses geared to individual job requirements. Using the example of marketing personnel, ERFA placed top priority on speaking skills, specifically the ability to communicate orally with secretarial staff and top management; next they placed the ability to write to secretarial staff and the engineering staff; and finally, the ability to read and comprehend materials from top management. Combined with these very specific skills involving a narrow set of technical vocabulary, ERFA identified as an outcome the ability to negotiate while maintaining a positive and productive attitude (Beneke, 1981).

In most programs a distinction was made between general language objectives and technical language objectives, a distinction based on the results of task analyses and word frequency counts. Surprisingly, in all programs including those of ERFA companies, general language was considered more important than technical. Although technical language is important, it is considered easier to learn once general language is mastered. Inman (1978) found that technical language constituted only 21% of the language used on the job when analyzed linguistically. Other research done in this area indicates that the percentage of technical language varies from job to job. Technical language is more important for engineers than for managers. Some linguists voice an opposing view, however. Dany (1985) recommends using some technical language in the initial stages of language training to motivate the trainees. Coutts (1974) rejected the idea that specialized language could not be taught before general language was mastered. Her training model for airline personnel included technical language at the very beginning stages of training.

Communicative competence as a general goal includes in all cases appropriate cultural behaviors in addition to linguistic competencies. Biersteker's (1986) testing model for business needs evaluates cultural as well as linguistic behaviors. Cere (1986) provided a list of culture-related competencies that could serve as a separate cultural component of a training program. These competencies include:

1) Self-awareness, a professional's awareness of his/her own behavior and attitudes.
2) Cross-cultural understanding, a professional's understanding of the similarities and differences between cultures.
3) History/traditions, one's knowledge of the socio-economic, political and historical development of the country.
4) Counterpart orientation, knowledge of the host country's culture surrounding the given profession or job.
5) Coping strategies, a repertoire of coping skills to assure a positive experience by the trainee in the host country.

Interestingly the above description of non-linguistic training given by Cere (1986) is similar to the Peace Corps Core Curriculum for preparing volunteers to work in host countries. The elements listed above, of course, refer to training that goes beyond the language classroom.

Program Design: Selection of Materials. A common complaint among all program descriptions was a shortage of appropriate materials for business language programs. Most programs relied on a combination of commercial instructional materials and teacher-prepared materials. Business materials had to be up-to-date, hence, almost by definition, needed to be customized. Instructors in the Arizona State LIPP program wrote all their own materials (Gunterman, 1984a). In-house trainers have the advantage of having ready access to technical content materials related directly to the needs of the trainee's job and to the needs of the company.

The selection of materials requires the same distinctions mentioned previously between general and technical language. In the case of the Costa Rican Bankers' Association, instructional materials addressing technical aspects of banking in Costa Rica were prepared by the instructors on the basis of interviews with each banker as well as observations of the bankers at work. Hence technical language was taught using teacher made materials, while general business language such as introductions, telephone transactions, negotiating insurance coverage or the rental of an office, travel transactions and bank exchanges might be available in

commercially produced LSP materials. The language program designed for the Costa Rican Bankers' Association, for example, employed among its instructional materials the paperback version of *English for Banking and Finance* (Stillman & Gordon, 1983). This commercial text covered general banking topics such as savings accounts, checking accounts, loans, investments, electronic banking and automatic teller machines. Selective use of commercial materials can save time without compromising the customized approach of in-house programs. Finally, ERFA trainers argued for the use of learning modules to teach technical language. Modules can be modified without changing the design of the entire program. Modules can be built around annual reports, technical reports, office forms, business letters, magazines and newspapers. Dropping a module from a training program or rewriting modules to fit recent changes in procedures or technology allows the trainer to make changes without extensive program revision (Worth & Marshall, 1981).

Program Design: Selection of Training Methods. Before addressing teaching methods, a profile of the trainer or training staff requires some discussion. Almost all the in-house programs reviewed used a combination of trained linguists and native speakers of the target language. Deveny (1986) used native speakers recruited from the university to provide international students the opportunity to learn technical language in computer science. Nolan, Grynspan and Klein (1984) brought six graduate students to San Jose Costa Rica from the U.S. to use as trainers for banking professionals under the direction of an expert in TESOL. An in-house training program, as case studies indicate, requires at least one individual trained in the areas of linguistics, program development and the business operations of the company. In the case of the Costa Rican Bankers Association (Nolan, Grynspan and Klein, 1984), knowledge of the business operations of the companies was provided by the Executive Secretary of the Costa Rican Bankers' Association and the President of the Banco de Costa Rica, both of whom reviewed and approved the training design and the instructional materials. Having the experts in language and program development different from the experts in the corporate culture of the banks was a disadvantage. Rippert-Davila (1985) puts it nicely when he observes that the language instructor must have expertise that spans three cultures--home country, host country and corporate. The ERFA group recommends a full-time linguist who is also trained in adult teaching methods and program development and administration (Freudenstein, 1981). The setting of the training should be somewhat informal and comfortable. The ideal setting for a language training program would be a home-like room with comfortable chairs together with appropriate instructional aids such as overhead, video recorder, monitor, audio tape player, flip chart, white board, maps and dictionaries.

Few aspects of teaching methodology have been debated as much as the time of training. And, in no other learning task is there such a direct relationship between practice time and proficiency. However, among cases studied programs varied in length from a 40 to 400 contact hours. Programs also varied from full time to part time. Some European programs, for example, met 90 minutes per week for 30 weeks. Others met full time for two weeks and still others, half-time for 20 weeks. The Foreign Service Institute typically trains their ambassadorial and consular staff for 16 weeks in a full-time, intensive setting, depending on the target language. Peace Corps devotes from 180 to 240 hours of intensive language training, typically in a twelve week format. However, the Peace Corps method really includes considerably more contact hours, since Peace Corps training is conducted in the countries of destination where trainees benefit from total immersion every waking hour of the day.

Two distinct types of programs were identified in both the literature and the field studies—intensive and extensive. Shallis (1979) reported that a third of the institutions she studied preferred a combination of intensive and extensive programs. Campbell, Hallman, and Geroy, (1988) surveyed international companies in Florida regarding their practices in this regard. Sixty-seven percent (67%) had no preference for program length. Gill (cited in Shallis, 1979) showed that an operational level in a foreign language takes 500 hours extensively (three years at four hours a week) 400 hours intensively (six to seven hours per day), and 250-300 hours by immersion (50 hours a week).

Based on the programs reviewed in this study, 250 hours of classroom instruction seem to make up the minimum time frame necessary to achieve the outcomes of the trainee's being able to communicate at a basic level in a variety of social and professional situations. A Foreign Service Institute rating of FSI 1 (elementary proficiency), which is equivalent to the Intermediate level on the ACTFL scale requires approximately 240 hours of instruction according to Guntermann (1984a). In Europe, at least 270 hours of instruction are considered necessary to reach "threshold level," the minimum level of language competence for survival in a foreign country (Dannerbeck, 1987, p. 418).

The Evaluating or Assessing of Training Outcomes: Evaluation of foreign language training programs was conducted on three levels. First, perhaps most immediate and tangible, is the evaluation of trainee learning and performance during and after training; second, the quality of the training itself, and finally, the evaluation of the effectiveness of the overall program to justify training expenditures to the company's or agency's fiscal unit.

Evaluating trainee performance takes two basic forms, use of standardized pencil and paper tests and use of oral observations and interviews. The interviews are standardized insofar as they employ a standard set of questions and stated criteria for assessment. On the other hand, even standardized interviews cannot be considered objective, since they require individual interpretation and judgment. Some European programs used objective testing including written tests and multiple choice tests covering vocabulary, grammar, cultural information, reading and listening comprehension (Freudenstein, 1981). They also use observations of role-play, evaluations of written composition and letter writing, as well as the interview. It was observed that European and Japanese companies had more comprehensive approaches to evaluation than did U.S. companies. In the United States there is a growing trend to use standardized, proficiency-based evaluation methods of foreign language skills (Buck and Hiple, 1984). Proficiency guidelines and ratings have been developed by government agencies as well as by the American Council for the Teaching of Foreign Languages (ACTFL).

Besides linguistic performance, evaluation of trainees also included an assessment of culturally appropriate behaviors. Often, this type of evaluation was qualitative in nature, occasionally, quantitative when reduced to pencil and paper instruments. In assessing, both language and culturally appropriate behavior most programs have abandoned achievement testing in favor of proficiency testing. Proficiency testing focuses on the "functional use of the totality of the language compared to that of an educated native speaker" (Buck & Hiple, 1984, p. 525). This is basically the approach of government institutions such as the Foreign Service Institute, the CIA, the Peace Corps, and the Defense Language Institute all of which used scales developed by the Interagency Language Roundtable which are commonly referred to as FSI scales. In this approach a face-to-face oral interview conducted by a native-speaker is used to determine the point of "...linguistic breakdown, the level at which the candidate can no longer maintain linguistically accurate and culturally appropriate performance (p. 527)." Another proficiency testing instrument is the Biersteker (1986) interview format which can be used to predict communicative competence in specific situations. This evaluation instrument consists of a cultural skills area and a language skills area. The instrument evaluates trainees in each area according to their production and understanding of the target language and their social interaction with native speakers.

However sophisticated the above approaches may be, such assessments are inferential when compared to on-the-job performance (Crawford, 1983). Unfortunately, language trainers rarely have the opportunity to observe subsequent on-the-job performance of trainees. It is recommended that in-house programs afford trainers the opportunity for follow-up observations of trainees on the job in the interests of better program evaluation.

Conclusions: the Model

The model devised by the researchers can best be summarized by addressing a series of subordinate decision points grouped according to the Houle's model as adapted by the researchers.

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Needs Analysis

Company Needs: Questions to be asked by the linguist/trainer and directed to upper management:

1. What are company long-range language-related goals?
2. What are immediate language-related problems?
3. Can language training help solve these problems or should other solutions be found?
4. What is the company's commitment to training?
5. What is the time frame for training?
6. What resources are available for training?
7. What are company expectations of the training effort?

Job or Task Needs: Questions to be asked by linguist/trainer and directed to returned expatriates, middle management and technical experts:

1. What are the specific language-related skills, knowledge, attitudes and behaviors necessary to perform this job?
2. What type of language (general or technical) is necessary to perform this job?
3. What language skill (listening comprehension, speaking, reading, writing) is most important?
4. What level of proficiency is required?
5. What are the most common situations (social and professional) involved in this job?
6. What are the culture-related skills, knowledge, attitudes, and behaviors necessary to perform this job?

Trainee Needs: Questions to be asked by the linguist/trainer and answered by the trainee:

1. What is the trainee's learning biography?
2. What is the trainee's past language experience?
3. What personality traits does the trainee have that help or hinder language learning?
4. What is the strength of the trainee's motivation to learn?
5. What physical limitations does the trainee have that might affect learning?

Program Design:

Goals and Objectives Areas to be considered by the linguist/trainer include:

1. General goal of the training program and overall time frame.
2. Specific objectives directly related to the needs analysis. These objectives will be expressed in behavioral or performance terms. For example, by week 12 the trainee will be able to give a 15 minute demonstration of our primary product to a group of potential clients using appropriate vocabulary, grammatical structures with culturally appropriate gestures and culturally appropriate references.
3. Specific objectives should include time frames.
4. Specific objectives should adhere to inventories of social situations with accompanying vocabulary, structures, and cultural information as well as professional or job-related situations.

Program Design: Materials Selection: Materials should include:

1. Social situation modules prepared by the linguist/trainer
2. Job specific modules prepared by the linguist/trainer
3. A grammar text which could be a commercially available item
4. Exercises and drills based on modules prepared by the linguist/trainer.
5. Magazines, newspapers, professional journals, annual reports, and other literature pertaining to company goals or local culture.

6. Audio visual materials including video tapes and over-head transparencies.
7. Computer assisted exercises if available
8. Commercially available foreign language for specific purposes texts, if available.

Program Design: Methods: The methods identified in this study include the selection of instructor, choice of specific instructional method and setting, and the scheduling of learning activities.

Instructor should demonstrate:

1. expertise in linguistics and be either a native speaker or demonstrate a target language proficiency at FSI Level 4.5.
2. expertise in foreign language teaching methodologies and even in adult education methodologies.
3. should have expertise both in the culture of the target country and the culture of the company.

Time Frames should be at least 250 hours of instruction for an Indo-European language with any of several combinations of extensive or intensive scheduling. More time would be needed for non Indo-European languages

Evaluation techniques

1. Trainee evaluation through oral interviews interpreted according to agreed-upon criteria
2. Objective testing of the trainee for specific skills and knowledge
3. Observation of trainee's performance in role play or on the job
4. Observation of trainer's performance in the classroom
5. Evaluation of the trainer done by the trainees
6. Evaluation of the program to determine whether goals and objectives were attained.
7. Evaluation of the program to determine cost-effectiveness.

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